

# A Miniaturized Adaptive Optic Device for Optical Telecommunications, Phase I

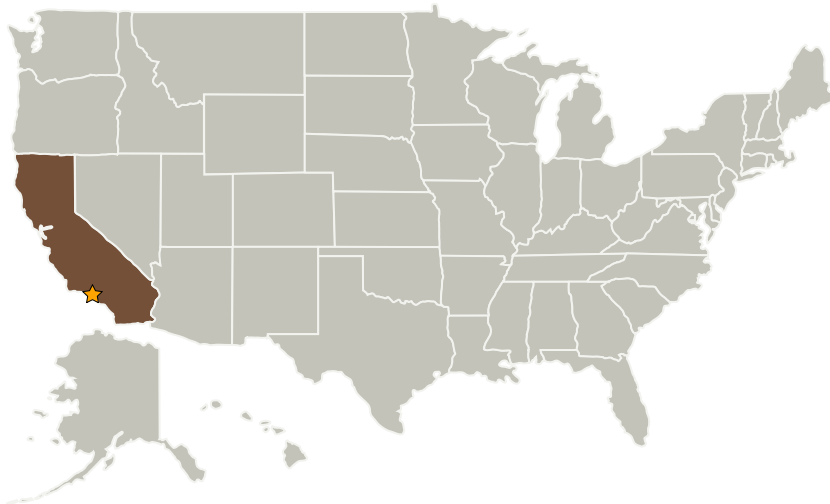
Completed Technology Project (2006 - 2006)



## Project Introduction

To advance the state-of-the-art uplink laser communication technology, new adaptive optic beam compensation techniques are needed for removing various time-varying atmospheric disturbances on an uplink laser beam. The net effect of atmospheric wavefront turbulence produces degraded laser beam quality and limited data transfer rates and communication range. Crystal Research, Inc. proposes to develop a new type miniaturized adaptive optic device that is capable of removing all significant atmospheric turbulence distortions. The proposed device is based on electro-optic phase modulation in a single crystal substrate through electro-optic effect. By avoiding actuator systems associated with moving mirrors, the proposed innovation not only significantly reduces cost, size, weight, and power consumption, but also greatly enhances the system performance and reliability. The superior parameters of the proposed device could enable meeting the stated NASA mission goals of boosting data transfer rates in optical communication by a factor of 10-100 relative to the current state of the art. The new capabilities of the proposed adaptive optic device could lead to important advances in deep space and other optical communication systems. In Phase I, we will fully exploit the advantages and feasibility of the proposed concept by demonstrating critical component technologies in laboratory breadboard experiments.

## Primary U.S. Work Locations and Key Partners



A Miniaturized Adaptive Optic Device for Optical Telecommunications, Phase I

## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## A Miniaturized Adaptive Optic Device for Optical Telecommunications, Phase I

Completed Technology Project (2006 - 2006)



Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Crystal Research, Inc.	Supporting Organization	Industry	Fremont, California

### Primary U.S. Work Locations

California

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

Carlos Torrez

## Technology Areas

### Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - └ TX05.5 Revolutionary Communications Technologies
    - └ TX05.5.2 Quantum Communications